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BOOK OF ABSTRACTS

PF 1

DEVELOPMENT OF A SEQUENTIAL INJECTION METHOD FOR BROMATE DETERMINATION IN SOIL LEACHATES

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Bromate, specifically potassium bromate, has been related to some adverse health effects [1] and considered as potentially carcinogenic to humans by the International Agency for Research on Cancer [2].
Although bromate is not normally present in water, it can occur as a result of industrial pollution or as consequence of soil contamination. In fact, there are several uses for potassium bromate and sodium bromate as powerful oxidizers, for example, in the textiles dyeing process that uses sulfuric dyes. In addition, water disinfection treatments like ozonation promote the oxidation of halogenides naturally present in water, namely bromide, to bromate [2]. There are several methods for the determination of bromate described such as ion chromatographic methods, gas chromatographic methods and capillarity electrophoresis [3].
Flow analysis methods, sequential injection analysis (SIA) in particularly, have been extensively used for water monitoring due to several advantages like real-time, robustness, reliability, as well as the versatility [4]. The latter is essential to incorporate additional pre-concentration and/or clean-up procedures together with in-line digestions and/or redox reactions.
The aim of this work was to develop an automatic flow analysis method for bromate determination in soil leachates. The idea was to explore the main features of flow methodologies to attain an environmental friendly and low-cost method as an alternative analytical tool for bromate monitoring. The spectrophotometric detection was based in the reaction with *o*-dianisidine (ODA) but other reagents, fuchsin and chlorpromazine, were also studied aiming for the highest sensitivity. For the application, LSSC (laboratory scale soil core) columns were used to produce leachates with and without simulation of potential contamination.

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[1] Kurokawa, Y.; Maekawa, A.; Takahashi, M.; Hayashi, Y. *Environ. Health Perspect.*, **1990**, 87, 309-335.
[2] World Health Organization; *Guidelines for Drinking-water Quality*, **2011**, 324-325.
[3] Michalski, R.; Lyko, A. *Crit. Rev. Anal. Chem.,* **2013**, *43*, 100-122.
[4] Mesquita, R. B. R.; Rangel, A. O. S. S. *Anal. Chim. Acta*, **2009**, *648*, 7-22.